COVER CROP (340) REQUIREMENTS IN TENNESSEE

2015 Environmental Quality Incentives Program (EQIP)

Purpose: To improve soil health function by controlling erosion, building organic matter, increasing available water holding capacity, and promoting nutrient retention and recycling.

Objective: To continue the growth of the cover crops for the production of biomass above and below the ground for as long as possible before the following crop is planted.

Eligible Land: Cropland where annual crops are grown.

Soil Testing: Using the Solvita test is recommended for selecting the best cover crop mixes to increase soil biology. Results can also be used to determine when fertilizer inputs can be reduced. Soil samples taken at the same time (either fall or spring) and location will best document soil health trends over time.

Planting Requirements:

- Cover crops and the following crop will be planted no-till. Plant the following crop no-till into the standing cover crop residue. Consider using a crop roller when planting. **NOTE:** Aerial seeding is a no-till method (application timing during moist conditions is best).
- Tilled cropland can convert to a no-till residue management system.
- Planting dates are to be strictly adhered to and producer is locked into a planned crop rotation.
- Cover crops are **not** to be managed as a harvested crop. P and K can be applied to cover crop for the crop following the cover crop.

Termination Requirements:

- In order to benefit from nitrogen fixation by legume cover crops, allow legumes to reach early bloom stage prior to being killed.
- For pollinator crops, allow plants to reach full bloom.
- **Do not allow cover crop to go to seed,** however, in mixed species stands allowing some species to go to seed is acceptable, but realize the potential impacts on future wheat crops.
- Cover crops will serve as cover for a **minimum of 90 days.**
- At termination, the cover crop should have 90% or better ground cover and a **minimum height of 8 inches**.
- Terminate cover crops 7 to 14 days prior to planting to reduce allelopathic (toxic) activity toward the primary crop. Sorghum and cereal rye are plants that have strong allelopathic activity which may be beneficial for weed control.

Grazing Cover Crop Requirements:

- Only producers with a commitment to manage grazing heights are allowed to graze cover crops.
- Management technique will be to take half-leave half; allowing cover to reach 8" height then graze to 4" minimum height, maintaining 70% ground cover.
- Producer must have an area to remove livestock from the cover crop when the cover crop is vulnerable to overgrazing or excessive trampling.
- Cover crop can be grazed to a 4" minimum height prior to termination.
- No mechanical harvest (e.g. silage, balage, hay etc.) allowed.
- Base sacrifice area on feeding site assessment tool. Sacrifice area will not receive payment.

Leave an untreated area:

- For all cover crops, leave a portion of the field or similar field to compare results.
- Area should be wide and large enough to get a reliable yield monitor reading.
- Only planted cover crop acres will receive payment.

Planting Options:

- When planting with a drill use the lower recommended seeding rate. For broadcast (aerial) seeding, seed a minimum of 1.3 times the low rate.
- In developing mixes, seed a minimum of 70% legume in Nitrogen fixing cover, 70% brassicas in Nitrogen scavenging mixes, or develop mix based on C:N ratio.
- Total seeding rate will equal 100% or higher. Up to 20% of mix can be a species that will be terminated by frost or heat (e.g. buckwheat with cool season mix planted in August.)

Select Cover Crop Purpose:

- **Soil Protection/Nitrogen Scavenging (up to 3 yr):** Five species minimum (e.g. Rye, oats, wheat, radish, and turnips) (70% of full mix rate will be brassicas). Target the C:N ratio to be 24:1 but less than 31:1. Each species will make up 10% or more of the mix.
- **Nitrogen Fixing Cover (up to 3 yr)**: Five species minimum Cool season: Austrian winter peas, crimson clover, red clover, Vetch; Warm Season: Cow peas, Sun hemp. Adding 20% of full mix rate will be grass like rye or wheat on slopes over 3% in West TN and over 5% in Middle and East TN. (70% of full mix rate will be legumes). Target the C:N ratio to be 24:1 but less than 31:1. Each species will make up 10% for more of the mix.
- **Soil Health Cover (1 or 2 yr planting at same payment level as Nitrogen Fixing Cover, highest payment rate for 3 yr):** (small grain, legume and brassica mix 5 species minimum): see planting options above and in tables.
    - Target C:N ratio prior to a high residue crop to be 30:1 or less.
    - Target C:N ratio prior to a low residue crop to be 31:1 or higher.
- **Organic Weed Control Cover (up to 3 yr):** Cereal rye or cereal rye mix with legumes and brassicas. Cover crop will be rolled at termination.
- **Orchard/Vineyard Cover (up to 3 yr):** Crimson clover and annual ryegrass.

C:N Ratio: The C:N ratio effects residue cover and nutrient cycling. For early soil health conditions (beginning stages), the target C:N ratio is 24-30:1. After soil health is more developed, the target C:N ratio will increase to 31-50:1. Look at the soil surface, if the residue is lacking increase the C:N ratio. If residue is building up on the soil surface, then decrease the C:N ratio of the cover crop.

Cover Crop Example Mixes				
Crop Mixtures	**Seeding Rate lb/ac Drilled**	**Broadcast**	**Seeding Date**	**C:N ratio Late Vegetative Stage**
Soil Health Building Cover Crop Mix (Cool Season planted after corn)				
Cereal Rye	18	24	Aug. 15 to Oct. 15	30
Oats	22	28		
Austrian Winter Pea	8	10		
Radish	2	2		
Turnip	2	2		
Soil Health Building Cover Crop Mix (Cool Season planted after corn)				
Cereal Rye	20	26	Aug. 15 to Oct. 15	31
Wheat	15	20		
Crimson Clover	5	6		
Radish	2	3		
Hairy Vetch	4	5		
Soil Health Building Cover Crop Mix (Cool Season planted after soybeans)				
Oats	20	26	Aug. 15 to Oct. 15	28
Wheat	17	22		
Crimson Clover	3	4		
Radish	2	2		
Turnip	2	2		
Soil Health Building Cover Crop Mix (Warm Season)				
Buckwheat (optional)	1	1	April 20 to July 1	21
Sunflowers (optional)	1	1		
Sudangrass	5	6		
Millet	5	5		
Cowpeas	11	14		
Soybeans	11	14		
Turnips	1.5	1.5		

N-Scavenging Cover Crop Mix				
Cereal Rye	14	18	Aug. 15 to Oct. 15	26
Oats	19	24		
Radish	6	8		
Turnip	5	6		
Clover/Pea/Ethiopian Cabbage	1	1		
N-Fixing Cover Crop Mix planted after corn				
Cereal Rye	30	24	Aug. 15 to Oct. 15	24
Wheat	23	20		
Crimson Clover	11	14		
Austrian Winter Pea	35	46		
Turnip/Radish	1	1		
N-Fixing Cover Crop Mix planted after soybeans				
Wheat	23	30	Aug. 15 to Oct. 15	25
Crimson Clover	5	6		
Austrian Winter Pea	14	18		
Hairy Vetch	5	6		
Radish/Turnip	1	1		

- All mixes are only examples of mixes that can be used. Other mixes can be approved for use.
- Seed needs to meet the state seed law. It can be variety not stated (VNS) or certified seed or seed harvested from producer's farm.
- Seeding rate can be increased on all species but be aware that early production species can shade and reduce the stand of slower growing species. E.g. turnips could reduce the stand of crimson clover.
- Some producers have reported a corn yield drag after cereal rye. In TN this has not been an issue. If it is a concern, other small grains can be substituted. Most likely the issue is too much carbon in mixture causing a higher C:N ratio.
- Recommend not use brassicas preceding cotton.
- Brassicas are heavy feeders and caution needs to be taken when using them. Maintain good fertility for the following crop.
- Mixes can be developed using the Green Cover Seed Smart mix calculator. No more than 3 lbs of brassicas is typically recommended in a mixture, expect for Nitrogen Scavenging cover crops. http://www.greencoverseed.com/smartmix_web/smartmix_web.htm
- High biomass cover crops, like cereal rye, have worked best in control of palmer amaranth.
- Annual Ryegrass has allelopathic (toxic) nature too but is only recommended for those who have experience using it. Annual ryegrass especially Italian ryegrass can be hard to kill and become a weed.
- Sorghums are warm season annuals with some reported allelopathic nature.
- Buckwheat is a succulent fast growing annual that winter kills very easy; it or other warm season cover crop species can make up 20% of the mix. Buckwheat is a very good attractant of beneficial insects.
- Legumes are typically coated and pre-inoculated if not order fresh inoculant and inoculate seed at seeding.

Producer

District Conservationist

Additional seeding options					
Plant Species	**Peak Bloom Period**	**Seeding Rate Lb/Ac**		**Seeding Date**	**Note**
		Drilled	**Broadcast**		
Alfalfa (CSP) (ss)	May	15	20	Aug 15 to Oct 15 March 1 to May 1	Tap root
Buckwheat (WSA)	21 day after planting	35	50	June 1 to Aug 15	Quick warm season cover, can be added as a minor component of fall cool season mix
Clover, crimson (CSA) (ss)	May	20	26	Aug 15 to Oct 15 Feb 20 to April 1	Tap root, late spring growth
Clover, berseem (CSA) (ss)	June	15	20	Feb 20 to April 1	Tap root
Clover, red (CSP) (ss)	July	10	13	Aug 15 to Oct 15 Feb 20 to April 1	Tap root
Cowpea (WSA) (ss)	July	50	65	May 20 to June 20	Tap root, High N producer
Millet, Browntop (WSA)	August	25	33	May 1 to July 1	Quick cover
Oats (CSA)	May	100	130	Sept 1 to Oct 1 Feb 20 to April 1	May freeze out
Radish, forage (CSA) (ss)	-	8	10	Aug 15 to Oct 15 best sown before Sept 15 Feb 20 to April 1	may freeze out at 25 degrees F, tap root
Rye, cereal (CSA)	May	75	98	Aug 15 to Nov 20	Allelopathic to palmer amaranth, plant small seeded crops 2 wk after rye termination
Sudangrass (WSA) (ss)	July	25	33	May 1 to June 20	Strong roots
Sunflower (WSA)	July - Aug	4	5	April 15 to May 15	Fast establishment
Sun hemp, (WSA) Tropical	-	30	40	May 1 to July 20	Need 60 days minimum growth high biomass and N producer
Sweet clover (CS Biennial) (ss)	July	8	10	Aug 15 to Oct 15 Feb 20 to April 1	Allelopathic to thistle and green foxtail
Turnips (CSA) (ss)	-	3	4	Aug 15 to Oct 15 Feb 20 to April 1	Very small seed (electric seeder or carrier like pelletized lime or crimson clover
Vetch, hairy (CSA) (ss)	May	30	40	Aug 15 to Oct 15 Feb 20 to April 1	Can be invasive, late spring growth, tolerant of low fertility, High N producer
Wheat (CSA)	June	100	130	Sept 15 to Nov 10 Feb 20 to April 1	Low cost quick cover, reduced vigor following sorghums
Winter Peas, Austrian (CSA)(ss)	May	50	65	Aug 15 to Oct 15 Feb 20 to April 1	Slow to establish

Note: CSA = Cool Season Annual, CSP = Cool Season Perennial, WSA = Warm Season Annual, WSB = Warm Season Biennial, ss = subsoiler crop